

## 09 - Functions

Ex. No. : 9.1

Date: 1/06/2024

Register No.: 231401001

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## Abundant Number

An abundant number is a number for which the sum of its proper divisors is greater than the number itself. Proper divisors of the number are those that are strictly lesser than the number.

### **Input Format:**

Take input an integer from stdin

### **Output Format:**

Return Yes if given number is Abundant. Otherwise, print No

### **Example input:**

12

### **Output:**

Yes

### **Explanation**

The proper divisors of 12 are: 1, 2, 3, 4, 6, whose sum is  $1 + 2 + 3 + 4 + 6 = 16$ . Since sum of proper divisors is greater than the given number, 12 is an abundant number.

### **Example input:**

13

### **Output:**

No

### **Explanation**

The proper divisors of 13 is: 1, whose sum is 1. Since sum of proper divisors is not greater than the given number, 13 is not an abundant number.

For example:

Test	Result
print(abundant(12))	Yes
print(abundant(13))	No

```
def abundant(n):
```

```
    if n <= 0:
```

```
        return "No"
```

```

sum_of_divisors = 0
for i in range(1, n):
    if n % i == 0:
        sum_of_divisors += i
if sum_of_divisors > n:
    return "Yes"
else:
    return "No"

```

	Test	Expected	Got	
✓	print(abundant(12))	Yes	Yes	✓
✓	print(abundant(13))	No	No	✓

Passed all tests! ✓

Ex. No. : 9.2

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## **Automorphic number or not**

An automorphic number is a number whose square ends with the number itself. For example, 5 is an automorphic number because  $5*5 = 25$ . The last digit is 5 which same as the given number.

If the number is not valid, it should display "Invalid input".

If it is an automorphic number display "Automorphic" else display "Not Automorphic".

Input Format:

Take a Integer from Stdin

Output Format:

Print Automorphic if given number is Automorphic number, otherwise Not Automorphic

Example input: 5 Output: Automorphic Example input: 25 Output: Automorphic

Example input: 7 Output: Not Automorphic

For example:

Test	Result
print(automorphic(5))	Automorphic

def automorphic(n):

    if n < 0:

        return "Invalid input"

    square = n \* n

    num\_str = str(n)

    square\_str = str(square)

    if square\_str.endswith(num\_str):

        return "Automorphic"

    else:

```
return "Not Automorphic"
```

	Test	Expected	Got	
✓	<code>print(automorphic(5))</code>	Automorphic	Automorphic	✓
✓	<code>print(automorphic(7))</code>	Not Automorphic	Not Automorphic	✓

Passed all tests! ✓

Ex. No. : 9.3

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## Check Product of Digits

Write a code to check whether product of digits at even places is divisible by sum of digits at odd place of a positive integer.

Input Format:

Take an input integer from stdin.

Output Format:

Print TRUE or FALSE.

Example Input:

1256

Output:

TRUE

Example Input:

1595

Output:

FALSE

For example:

Test	Result
<code>print(productDigits(1256))</code>	True

Test	Result
<code>print(productDigits(1595))</code>	False

```
def productDigits(n):
    digits = [int(d) for d in str(n)]
    product_even = 1
    sum_odd = 0
    for i, digit in enumerate(digits):
        if (i + 1) % 2 == 0:
            product_even *= digit
        else:
            sum_odd += digit
    if sum_odd == 0:
        return "False"
    if product_even % sum_odd == 0:
        return "True"
    else:
        return "False"
```

	Test	Expected	Got	
✓	<code>print(productDigits(1256))</code>	True	True	✓
✓	<code>print(productDigits(1595))</code>	False	False	✓

Passed all tests! ✓

**Ex. No. : 9.4**

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## **Coin Change**

complete function to implement coin change making problem i.e. finding the minimum number of coins of certain denominations that add up to given amount of money.

The only available coins are of values 1, 2, 3, 4

Input Format:

Integer input from stdin.

Output Format:

return the minimum number of coins required to meet the given target.

Example Input:

16

Output:

4

Explanation:

We need only 4 coins of value 4 each

Example Input:

25

Output:

7

Explanation:

We need 6 coins of 4 value, and 1 coin of 1 value



```

def coinChange(n):
    coins = [1, 2, 3, 4]
    dp = [float('inf')] * (n + 1)
    dp[0] = 0
    for coin in coins:
        for i in range(coin, n + 1):
            dp[i] = min(dp[i], dp[i - coin] + 1)
    return dp[n]

```

	Test	Expected	Got	
✓	print(coinChange(16))	4	4	✓

Passed all tests! ✓

Ex. No. : 9.5

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## Difference Sum

Given a number with maximum of 100 digits as input, find the difference between the sum of odd and even position digits.

Input Format:

Take a number in the form of String from stdin.

Output Format:

Print the difference between sum of even and odd digits

Example input:

1453

Output:

1

Explanation:

Here, sum of even digits is  $4 + 3 = 7$

sum of odd digits is  $1 + 5 = 6$ .

Difference is 1.

Note that we are always taking absolute difference

```
def differenceSum(n):
```

```
    n_str = str(n)
```

```
    sum_even = 0
```

```
    sum_odd = 0
```

```
    for i, digit in enumerate(n_str):
```

```
        if i % 2 == 0:
```

```
sum_even += int(digit)
```

```
else:
```

```
sum_odd += int(digit)
```

```
return abs(sum_even - sum_odd)
```

	Test	Expected	Got	
✓	print(differenceSum(1453))	1	1	✓

Passed all tests! ✓